A large-scale study of stress, emotions, and blood pressure in daily life
Supplemental Materials

Validation of Optic Sensor

Main Study

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Methods and Full Results for Validation Study of Optic Sensor

To examine the reliability and validity of the optic sensor, we recruited participants to take part in two lab visits and a 7-day field study where they provided frequent measures using both the optic sensor and an FDA-approved external blood pressure cuff. Measurements were completed via a smartphone-based app designed specifically for this study. The app gathered and stored the blood pressure data (including the cuff via Bluetooth connection) on the phone as well as uploading the measurements to a remote server. After each set of measurements, participants answered questions about their current context. Laboratory staff took a primary measurement in the lab that served as our main comparison. Participants then took additional measurements in the lab and field and recorded the responses on an app developed for this study that obtained blood pressure responses along with information regarding location and recent exercise.

Method

Participants. One hundred and twenty-three participants (71 female, 51 male, 1 transgender) recruited from the San Francisco area participated in this study in exchange for monetary compensation ($200), plus a bonus of an additional $50 for providing at least 85% of all check-ins during the field study. Participants were 54.5% White, 35.8% Asian or Pacific Islander, 10.6% Black or African American, .8% American Indian or Alaskan Native and 6.5% other races or ethnicities (participants selected all that applied). The sample was 9.7% Latinx. Participants were 35 years-old on average (Range = 20-78). Income ranged from less than $15,000 to more than $500,000 (*Median* = $50,000 to $75,000) and education attainment ranged from elementary school to graduate school degree (*Median*: 4-year college degree). Participants had an average body mass index (BMI) of 24.4 (Range = 15.3 – 41.4) and were generally healthy (63% reported having good or excellent health and 60% reported that they typically engage in vigorous exercise). Nine participants were specifically recruited from a hypertensive clinic because they were hypertensive to determine sensitivity of the sensor with this sample; eight of them on blood pressure medication. An additional two participants had managed their blood pressure and were not currently hypertensive, but were previously hypertensive. There were no exclusions to participating in this study other than being over 18 years of age and being able to read and respond in English to the surveys.

Procedure. Participants were scheduled to take part in two laboratory sessions with one week of field data collection in between the sessions. Prior to coming into the lab, participants were required to complete a series of individual difference questionnaires online using a secure website.

Lab Visit 1 (V1): When participants arrived in the lab, we confirmed that they were able to successfully measure their blood pressure using the optic sensor (embedded in Samsung Note 9 phones). Next, using the phone-based app, participants completed basic demographics, received instructions on how to complete the daily experience portion of the study, and were trained on how to take blood pressure measurements on the phone and FDA-approved external oscillatory cuff (A&D blood pressure monitor, UA-651BLE) that was fitted to the individual. Finally, participants completed a series of in-lab measurements using the phone and cuff devices to ensure they understood the instructions and could successfully complete measurements on their own. Lab staff provided the instructions, oversaw the practice measurements, and helped as needed. The in-lab measurements included an initial calibration (as is typical for cuffless blood pressure sensors) (1), as well as an initial measurement completed by trained research assistants. During this measurement, participants were required to sit with their feet flat on the floor (not crossed), their arm resting at their side, and remain quiet during the measurement. They were instructed to follow these instructions when completing measurements in the field. Participants also completed three more measurements in which blood pressure was assessed while participants were (a) supine, (b) sitting, and (c) standing in order to examine the range of variability in agreement between devices across different body positions.

At the end of V1, participants took the blood pressure measurement equipment with them, along with a small backpack for storing the equipment, a set of instructions, and a notepad for recording cuff-based values in case the Bluetooth connection did not work. That day served as Day 1 of the field study. For the next week, participants were required to complete five check-ins each day using the phone-based app. Check-ins included a blood pressure measurement and brief set of questions assessing participants' current context, thoughts, feelings, and behaviors. Participants received notifications on the phone that a check-in was available and the check-in remained open for a set period of time. Check-in times were individualized and based on wake and sleep times. The first check-in was anchored starting at the typical waking time and then available for the next three hours. A mid-morning, afternoon, and late afternoon check-ins were prompted every three hours based on the morning check-in. The evening check-in appeared one hour prior to the participants self-reported typical bedtime and was available for three hours. To increase compliance and integrity of the data, participants received daily contact from a study coordinator who ensured they were following protocol and answered any questions the participants had. We also provided monetary incentives for completing the majority of the check-ins.

On Day 8, participants returned for *Lab Visit 2 (V2).* During this visit, participants completed two additional blood pressure measurements before and after a paced-breathing task. Participants completed the measurements without help from lab staff to determine how well participants had managed the different monitors. The paced breathing task was completed at a ratio of six seconds inhalation, two seconds breath hold, and ten seconds of exhalation. They completed this task five times. Participants then returned the equipment, were debriefed, and received compensation.

Blood Pressure Measurement Procedure. The blood pressure measurements from the cuff and phone were taken as closely together as possible without interference. During a measurement the index finger on the non-dominant hand was placed on the optic sensor of the phone, the cuff was applied to the upper arm of the opposite, dominant arm and the measurements were obtained at the same time lasting approximately 30 seconds. If there was an error on one device, that measurement was completed again.

Exclusion Criteria: To prevent comparing the phone measurement to erroneous cuff measurements, we filtered out measurement sets in which the *cuff* had values indicating an error. To do so, we examined any estimates below or above typical cutoffs (SBP < 80 or > 190; DBP < 40 or > 150; HR < 35 or > 200). If the estimate was typical for that participant and the values for the other corresponding estimates seemed reasonable, we retained the measurement set (e.g., a DBP value of 57 when the average DBP for that participant was 59). If the estimate was an outlier for that participant and/or the other values were also extreme, we removed the entire measurement set prior to analyzing the data. This led us to remove 3 measurement sets in the lab data (out of 12 identified as containing extreme values) and 23 in the field data (out of 56 identified as extreme). An additional 122 measurement sets in the field lacked cuff-based HR data, but we retained the blood pressure estimates given that they were our primary focus. There were 12 check-ins from the field data that had repeat measurements for the same check-in, largely due to the cuff not capturing HR data for the initial measurement. For some of these, cuff estimates varied slightly between measurements. The second measurement with HR data was retained.

Measures. Final data for this study are available online[1]. No measures beyond basic demographics were used in the analyses reported here, which focus on assessing the validity and reliability of the optic sensor.

Data Analytic Plan. In order to examine the validity and reliability of the phone-blood pressure measurements, we analyzed both the lab and field data.

For the lab-based data, using guidelines from prior studies examining the validity of smartphone-based optic sensors (e.g, (2)) we examined (A) means and variability in measurements across devices, (B) bias and precision errors, (C) bivariate correlations between devices, and we also assessed (D) bivariate correlations between relevant demographic variables and devices. For the bias and precision analyses, we looked at the difference in blood pressure estimates between devices within each measurement set (bias), as well as the variability of those differences (precision). For each of these analyses, we also analyzed heart rate which can by reliably captured via photoplethysmography (PPG) and with a high level of accuracy using smartphone-based optic sensors (3), thus we viewed the results for heart rate as indicative of the ceiling effect for accuracy in this study.

For the field-based data, we looked at the correlations between participants' average blood pressure across all field measurements. We also examined the associations between devices within each measurement set using multilevel modeling (lme4 package in RStudio 1.2.5019 and mixed models in SPSS version 25). Given that measurements occurred within days and individuals, as well as within the five different check-in times, we tested for non-independence at each of these levels. The intraclass correlations (ICCs) revealed that a significant proportion of the variation between measurements was due to between-person differences (ICCs: .44 to .89). In contrast, very little of the variation was due to within-day (ICCs: .01 - .05) or within-check-in time (ICCs: .002 to .01) differences. These latter ICCs were well-under the suggested criterion of ICC = .10 as evidence of non-independence (4). Thus, our final model was two levels with blood pressure measurements nested within participants and all random variances and covariances included in the model. We also ran preliminary analyses to examine whether there was evidence of autocorrelations between measurements (i.e., whether residuals of measurements taken closer together in time were more highly correlated than those taken farther apart), but changes in estimates were negligible when applying an autoregressive structure to the residuals, thus we kept the more parsimonious model.

Each multilevel model included the cuff measurement as the outcome variable and the phone measurement as the predictor variable. We separated the phone measurement into two variables: a grand-mean centered **between-person variable** that captured each participant's average estimate across all check-ins and a **within-person variable** in which every participant's average score was subtracted from each of their measurements to capture how much each measurement varied from that participant's average. Creating these two variables allowed us to unconfound between- and within-person effects and determine how much agreement there was at the between-person level (i.e., do people who tend to have higher BP via the optic sensor also tend to have higher BP via the cuff?) and at the within-person level (i.e., when people tend to have higher BP than they usually do on the phone, do they also exhibit higher than usual BP on the cuff?).

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[1] https://osf.io/63pf5/?view_only=f1d8dee8607b470c8455b84f3e7edbc6

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Results

Lab-Based Measurements. *Descriptives***.** Means and standard deviations for each measurement set from both V1 and V2 are shown in Tables S1-S2. The distribution of estimates from the primary measurement are shown in Figure 1 (main paper). Bias and precision errors for the primary measurement are also shown in Figure 1 and in Bland-Altman plots in Figure S1. Descriptives for the field data (using each person's average measurement) are shown in Tables S6-S7

Bivariate Correlations. Bivariate correlations between devices for the primary measurement were strong (see Figure S1), suggesting good agreement between the two devices. Correlations ranged across the other measurement sets (see Table S3). Agreement was lowest in the supine position (SBP: .48; DBP: .70). The very high but not perfect correlations between heart rate demonstrate the ceiling effect for the measurement procedures in this study.

Correlations between each device and key demographic variables are shown in Table S4. To compare the blood pressure measurements on the phone and cuff to demographic variables, we averaged all of the blood pressure measurements taken in the lab while the participant was sitting (N = up to 4 measurements per person).[2] Measurements taken on the phone and cuff exhibited similar correlations with demographic variables. Comparisons of the correlations using Fisher-Z transformations suggested that none of the correlations differed ($Zs < .80$, $ps > .45$).[3]

We also looked at whether relevant demographics including age, sex, BMI, hypertensive status, and level of melanin in the finger (measured with a mexameter three times and averaged) were related to measurement accuracy. To do so, we looked at correlations between these demographic variables and the difference between the initial cuff and optic sensor measurements (both absolute and relative) for SBP, DBP, and HR. As shown in Table S5, there was some evidence that the difference between the cuff and optic sensor increased with age (SBP and DBP), BMI (SBP), hypertension (SBP), and melanin (DBP). When looking at the relative difference scores to ascertain the direction of these effects, the optic sensor underestimated BP at higher levels of Melanin and higher BMI, but there was no systematic bias for the other demographic variables (see right side of Table S5).

Field-Based Measurements. On average, participants completed 28 check-ins (out of 34 possible), with a range from 4 to 34. Ninety percent of the sample completed at least 25 check-ins. In total, participants completed 3,380 check-ins. Given that our focus was on intensive repeated measurements within person, we removed data from seven participants who completed fewer than 10 check-ins. After removing these data, along with measurement sets that included erroneous cuff values, we were left with 2,973 measurements from 109 participants, an average of 27 per participant.

Descriptives and Bivariate Correlations for Average of Measurements. Means and standard deviations per person are based on their average values across all check-ins and shown in Table S6 along with correlations between phone and cuff. Looking within days, we obtained each person's average across all measurements taken within a single day and then estimated person-level correlations for people's average phone and cuff values for each field day, these are shown in Table S7.

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[2] We also ran these analyses using only the initial measurement taken by the Lab staff and found the same pattern of results.

[3] For the observed range of correlation values, the differences would have had to be greater than .25 to achieve significance at $p < .05$ whereas the largest observed difference was .09.

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Multilevel Models. As shown in the bottom row of Figure S1, there was considerable variability in the agreement between devices within participants. That is, correlations between devices differed from person to person, ranging from -.51 to .78 for SBP and -.40 to .66 for DBP, with the majority of participants exhibiting positive correlations. As a comparison, the range was .51 to .98 for HR.

To test these differences empirically, we used multilevel models in which we predicted each cuff measurement from its corresponding phone measurement separated into between-person and within-person variables. Estimates are unstandardized, thus each b represents the predicted change in mmHg (or bpm for HR) for the cuff given a 1 unit change in the phone. Degrees of freedom were estimated using the Satterthwaite method of estimate which yields fractional *df*s for each estimate that vary depending on how much of the variance is explained by person-level differences. For **SBP**, the between-person estimate was b = .56 (SE = .05, $t(107.8)$ = 10.24, p < .001, 95% CI: .45, .67) and the within-person SBP estimate was b = .30 (SE = .03, $t(83.59)$ = 9.21, p < .001, 95% CI: .24, .37). For DBP, the between-person estimate was b = .64 (SE = .05, $t(106.9)$ = 11.86, p < .001, 95% CI: .53, .75) and the within-person estimate was b = .34 (SE = .05, $t(85.26)$ = 6.78, p < .001, 95% CI: .24, .44). As a comparison, for HR, the between-person estimate was b = .95 (SE = .02, $t(112.15)$ = 49.55, p < .001, 95% CI: .91, .99) and the within-person estimate was b = .86 (SE = .01, $t(73.34)$ = 60.91, p < .001, 95% CI: .84, .89).

These findings suggest that the phone and cuff are in greatest agreement when comparing average BP levels across participants. They are still significantly associated, but less so, when comparing deviations from average within each person. This may be due to several different reasons: First, an average value is a more stable estimate of a person's BP and can help reduce error from any single measurement. Second, the range of values between people was greater than the range of values within person, with people's estimates typically varying only about 6 mmHg for SBP and 3 mmHg for DBP across all of their check-ins. These small variations are more prone to error when comparing across measurement devices. Indeed, BP measurement has an accepted error rate (e.g., < 10 mmHg when validating devices; (5)). Third, there was a small amount of bias between devices (i.e., the phone and cuff averages were not identical) which meant a measurement of 120 mmHg might be greater than the phone average of 119 mmHg, creating a phone deviation score of +1 but lower than the cuff average of 121 mmHg, creating a cuff deviation score of -1. In other words, two measurements might be very close together at an absolute level, but the deviations would be negatively related to each other. Thus, there may be more noise when measuring and comparing individual fluctuations in blood pressure, especially if the fluctuations have a small range. However, both the between- and within-person effects were significant, suggesting that the optic sensor in the phone is reliably capturing changes in blood pressure.

Cuff-to-Cuff Comparison. Given the novelty of our methodology along with the fact that blood pressure measurements tend not to be perfectly correlated, even when comparing estimates from gold-standard measurements (e.g., two doctors using the auscultatory method) and can vary across the two sides of the body, we collected data from an additional 33 individuals using the same method of measurement described above, but with two different FDA-approved oscillatory-based external cuffs measured simultaneously on separate arms: the same A&D cuff and an Omron cuff (BP7100 3 series). These participants completed the same lab-based blood pressure measurements, plus three field measurements. Seven measurement sets were removed due to at least one estimate below the typical cutoffs. We also removed one additional measurement set which was an extreme outlier in terms of the lack of agreement between cuffs. We used the remaining 256 measurement sets as a reference for the typical agreement between any two blood pressure measurement devices using these methods. Mean differences and standard deviations of the differences (i.e., bias and precision measures), and cuff-to-cuff correlations are in Table S8. Although the relatively small sample size impedes our ability to directly compare these results to the results from the optic sensor, the descriptives from the two cuffs demonstrate an indication of the type of expected error possible when measuring blood pressure using common method approaches (cuff-based monitors).

References

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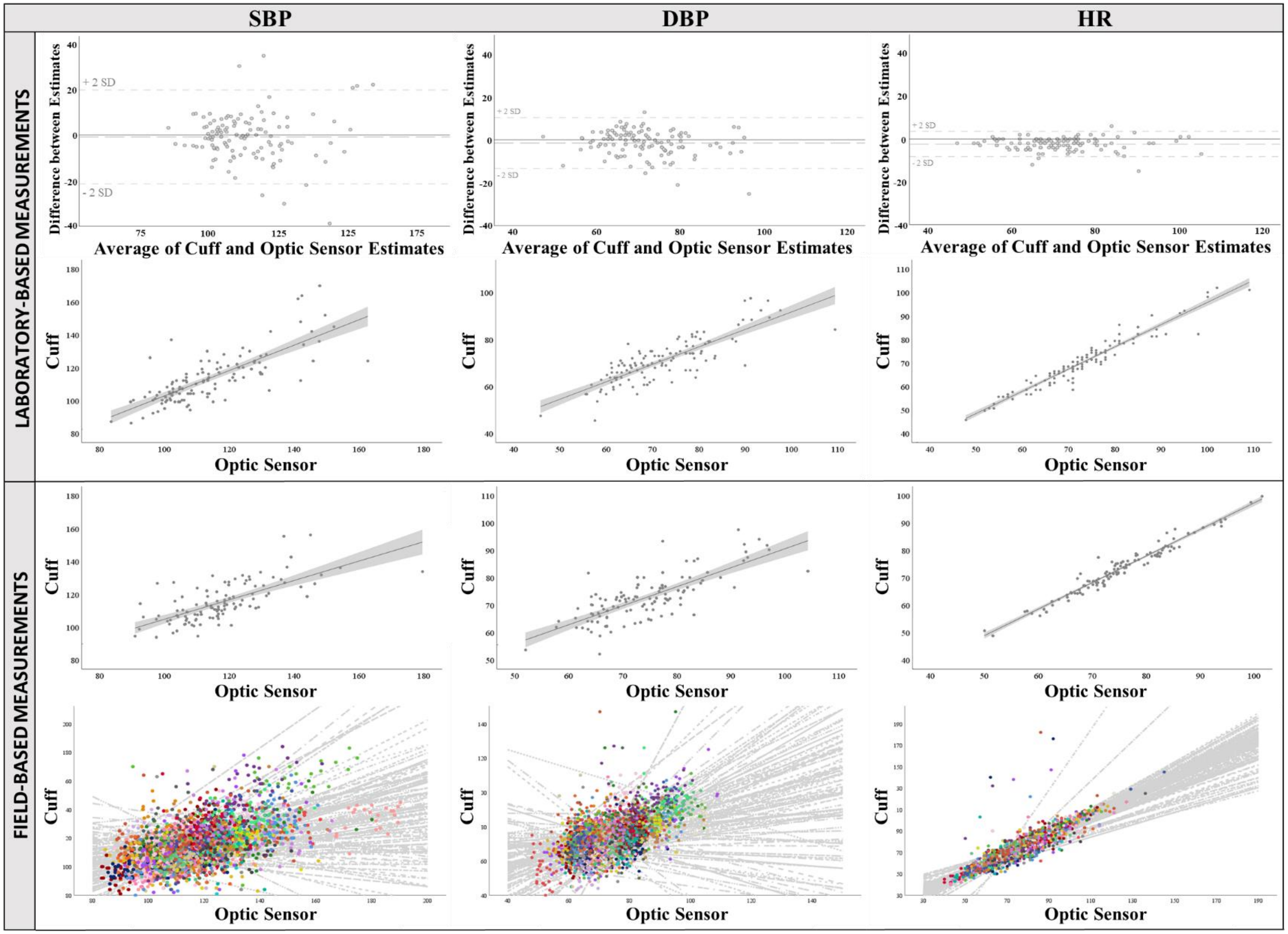

Figure S1. Bias and precision errors and correlations between optic sensor and cuff in laboratory and in the field. *Row 1*: Bland-Altman Plots for optic sensor and cuff from primary measurement in the lab. *Row 2*: Correlations between optic sensor and cuff from primary measurement in the lab. *Row 3*: Correlations between optic sensor and cuff for average of field-based measurements. *Row 4*: Spaghetti plots depicting each participants' individual points and slopes from for field-based measurements.

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Table S1. Validation Study Descriptive Statistics for Phone and Cuff across Different Body Positions

	Supine				**Sitting**				**Standing**			
	Phone		**Cuff**		**Phone**		**Cuff**		**Phone**		**Cuff**	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
SBP	113.81	15.93	112.37	14.34	112.84	14.88	111.38	14.89	114.95	14.73	111.57	16.30
DBP	73.68	10.98	69.72	9.92	72.63	10.19	72.10	9.67	72.73	10.57	75.57	10.33
HR	69.09	10.73	67.03	10.46	72.82	12.35	70.29	10.25	80.80	13.92	78.68	13.25

Note: N =101 Ps with complete BP data for both measurements; HR missing for 2 Ps for Sitting up & 1 P for Standing Up

Table S2. Validation Study Descriptive Statistics for Phone and Cuff Before and After a Breathing Exercise with Measurements done by Participant

	Pre-Breathe				**Post-Breathe**			
	Phone		**Cuff**		**Phone**		**Cuff**	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
SBP	115.35	15.21	114.15	14.20	113.42	14.96	112.57	14.76
DBP	72.81	10.21	72.68	9.27	72.07	10.40	72.86	10.41
HR	75.25	10.89	73.67	10.50	74.33	10.40	72.77	10.22

Note: N =111 Ps with complete BP data for both measurements; HR missing for 2 Ps Pre-Breathing & 4 Ps Post-Breathing

Table S3. Validation Study Correlations between Cuff and Phone across Different Measurement Sets in the Lab

	SBP	**DBP**	**HR**
Initial	0.78	0.82	0.96
Supine	0.48	0.70	0.96
Sitting	0.71	0.76	0.93
Standing	0.60	0.73	0.95
Pre-Breathing	0.61	0.73	0.95
Post-Breathing	0.62	0.71	0.95

Note: all correlations significant at $p < .001$

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Table S4. Validation Study: Correlations between Physio and Demographics for Lab-Based Phone and Cuff Measurements

	SBP		DBP		HR		
	Phone	Cuff	Phone	Cuff	Phone	Cuff	
Age	0.52**	0.57**	0.49**	0.47**	-0.02	-0.05	0-.2
Sex	0.27**	0.35**	0.05	0.02	-0.03	-0.03	.2-.4
BMI	0.46**	0.40**	0.38**	0.37**	0.14	0.12	.4-.6
Self-Reported Health	-0.25**	-0.23*	-0.18	-0.15	-0.10	-0.11	
Hypertension	0.44**	0.50**	0.29**	0.38**	0.05	0.02	

*Note: ** p < .01, *p < .05; measurements are average of all sitting measurements in lab; phone and cuff correlations do not differ significantly; For Sex, 1 = Male, 2 = Female; For Health, 1= poor to 5 = excellent; For Hypertension: 1 = Hypertensive, 0 = Normotensive*

Table S5. Validation Study Correlations between Key Demographics and Absolute and Raw Differences between Cuff and Optic Sensor

	Absolute Difference			Raw Difference			
Demographic	SBP	DBP	HR	SBP	DBP	HR	
Age	0.37***	0.32***	-0.12	-0.05	-0.16	0.09	0-.2
Sex	0.11	0.03	0.08	0.07	0.02	-0.01	.2-.4
BMI	0.22*	0.08	-0.02	-0.17	-0.12	0.02	.4-.6
Hypertension	0.24*	0.11	-0.02	-0.02	0.05	0.00	
Melanin	0.02	0.21*	-0.10	-0.25**	-0.21*	0.10	

*Note: ** p < .001; *p < .05; For Sex, 1 = Male, 2 = Female; For Hypertension: 1 = Hypertensive, 0 = Normotensive; For raw differences, higher scores indicate tendency for phone to underestimate, lower scores indicate tendency for optic sensor to overestimate, no correlation indicates no systematic bias*

Table S6. Validation Study Descriptives for Phone and Cuff Field Data

	Phone		**Cuff**		**Bias**	**Precision**	**Phone-Cuff Corr**
	Mean	*SD*	*Mean*	*SD*	*MeanDiff*	*SDDiff*	*r*
SBP	117.66	13.62	115.15	14.83	2.53	9.98	.70***
DBP	73.91	9.43	74.05	11.17	-0.11	6.27	.76***
HR	74.55	12.94	72.98	13.10	1.52	1.90	.98***

Note: N = 109; Descriptives compare each person's average across all field check-ins

Table S7. Validation Study Within-Day Average Correlations between Phone and Cuff

Day	SBP	DBP	HR
1	0.59	0.70	0.93
2	0.70	0.77	0.97
3	0.66	0.72	0.96
4	0.62	0.66	0.95
5	0.55	0.67	0.92
6	0.61	0.62	0.93
7	0.59	0.70	0.95
8	0.63	0.61	0.71

Note: all *ps* < .001; *N*s range from 96 to 109

Table S8. Descriptives and Correlations for Cuff-to-Cuff Comparison

	Lab-Based Measurements			**Field-Based Measurements**		
	Bias	**Precision**	**Cuff-Cuff Corr**	**Bias**	**Precision**	**Cuff-Cuff Corr**
	MeanDiff	*SDDiff*	*r*	*MeanDiff*	*SDDiff*	*r*
SBP	0.63	9.58	.75***	1.27	6.35	.77***
DBP	3.00	6.37	.72***	-5.29	7.15	.64***
HR	-0.61	5.86	.90***	0.15	2.42	.90***

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Main Study: Data Cleaning Procedure

Figure S1 depicts the attrition rate and dating cleaning procedure for this study. In order to obtain the final sample for analyses, participants were removed who: (1) had less than 3 daily check-ins (42% of the initial sample completed no daily check-ins) and (2) did not have a compatible phone (and thus no optic sensor for BP measurement). The 21-day diary included 63 possible check-ins, however the app allowed participants to continue using it after the three weeks, repeating the 21-day cycle. A small percent (2.7%) of the sample completed more than 100 check-ins (up to 964). To limit the influence of these super-users, we retained only the first 100 check-ins for final analyses. These cleaning procedures yielded a final sample of 22,015 participants who completed 360,858 check-ins, an average of 16.4 check-ins per person (SD = 21.97, median = 7, mode = 3).

Extreme values. Using cut-offs based on physiologic plausibility (SBP <80 & >190, DBP <40 & > 150, HR < 35 & > 200), we identified a total of 2,580 check-ins with at least one extreme value. Of these check-ins, 291 had an extreme SBP measurement, 2,367 had an extreme DBP measurement (the majority being below 50 mmHg), and 17 had an extreme HR measurement. The extreme values made up only .06% of the total check-ins, limiting the likelihood they would unduly influence results. In addition, mean levels of BP and HR across demographic groups were similar with and without the extreme values (see online supplements for mean comparisons). Thus, we used the entire sample for our main analyses.

Calibration. Although participants were only able to view blood pressure values if they offered an initial calibration, we collected raw estimated blood pressure values even with no calibration. Non-calibrated measurements are not meaningful when examining demographic or individual differences in raw blood pressure estimates. However, non-calibrated sensor data was included for within-person analyses which focuses on changes from baseline values. Therefore, we only use calibrated sensor data for between-person analyses (as reported in Table 1, main paper, *N* for final sample with calibrated data was 203,577 check-ins) and both calibrated and non-calibrated data for within-subjects analyses. Heart rate did not require calibration; however, when using only calibrated data we removed all non-calibrated estimates, including heart rate, in order to ensure that analyses for blood pressure and heart rate used the same data.

Calibration offset. Participants were able to recalibrate their optic sensor with an external cuff at any time, leading to different calibration values within the same person. Thus, for within-person analyses, in order to account for these calibration differences and equate measurements within each participant, offset values (the difference between the calibration value for that particular measurement and the algorithm default values) were subtracted from each blood pressure measurement. For non-calibrated measurements, the offset values were 0. Heart rate did not have an offset since no calibration was required.

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Main Study: Data Analytic Plan

All random intercepts and slopes were modeled. The variance-covariance matrix for the random effects was unstructured, modeling all variances and covariances. There was no structure applied to the residual variance-covariance matrix. Participants completed up to 3 check-ins per day. This non-independence within days was not an issue for our main analyses given that our predictors were only measured once a day. However, when looking at predictors measured at multiple check-ins (e.g., prior exercise), we controlled for check-in time by entering it as a categorical covariate. Predictor variables were coded so that 0 was set to the minimum value for all main effect analyses and the grand mean for all moderation analyses.

In this study, our focus was on within-person variation. That is, we wanted to test the extent to which people exhibited a change in their blood pressure and heart rate from baseline when experiencing changes in their stress and emotions *relative to how they typically feel*. In order to do this, we utilized a contextual model (Hamaker & Muthén, 2019) and entered between-person mean levels of our main predictors as covariates in the models along with the raw scores for the corresponding predictors. Thus, the original scaling of the predictors is maintained while reflecting the effects of daily variations of the predictor and not between-person differences. In addition, the model is called a contextual model because the between-person predictor reflects the contextual effect and is the difference in physiological reactivity between two people who are one unit apart in their average levels of stress/emotional intensity when they are equated on their current stress/emotional intensity. In other words, this estimate reflects the effect of individual differences when participants are having the same momentary stress/emotional experience.

We also examined whether blood pressure and heart rate were higher if participants had exercised vigorously within 30 minutes of taking their blood pressure measurement (N = 29,923 check-ins). Looking at calibrated estimates, we found that changes from baseline in SBP and HR were significantly greater for measurements captured after exercise (SBP: 5.38; DBP: -1.66; HR: 22.32) compared to measurements without exercise (SBP: -1.47; DBP: -1.66; HR: 11.79). DBP did not show the same change. We found a similar pattern when looking at change in blood pressure relative to the baseline value across all measurements (calibrated and non-calibrated; see supplemental materials for full results). Based on these results, we removed the check-ins captured immediately after exercise from our final analyses in order to prevent adding temporarily inflated physiologic responses due to recent exercise in our models focusing on stress.

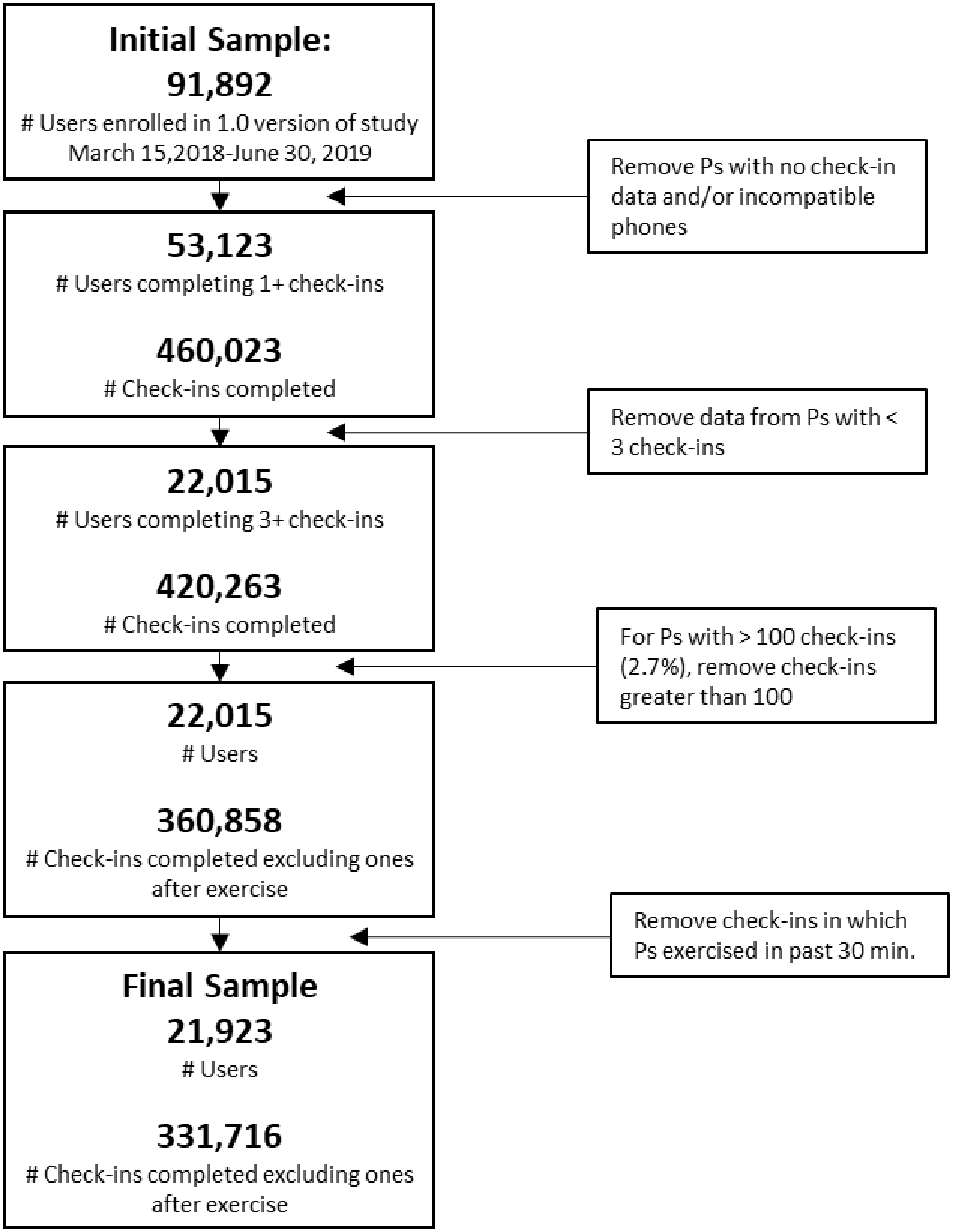

Figure S2. Data cleaning procedures

Table S9. Descriptive Values for Physiology, Stress, and Emotion

Daily Check-In Variables	*Check-In N*	*Mean*	*SD*
Physiology			
SBP Reactivity	331,716	1.73	9.03
DBP Reactivity	331,716	-2.03	7.95
HR Reactivity	331,716	14.30	10.21
Stress			
Morning Demands	29,352	1.08	1.11
Morning Resources	29,259	2.42	1.10
Morning Ratio	29,240	0.77	0.72
Afternoon Demands	100,529	1.33	1.19
Afternoon Resources	100,427	2.55	1.22
Afternoon Ratio	100,340	0.94	1.03
Emotion Intensity			
High Arousal Negative	12,210 (12%)	2.11	0.89
Low Arousal Negative	11,112 (11%)	2.05	0.92
Low Arousal Positive	46,294 (47%)	2.15	0.80
High Arousal Positive	29,680 (30%)	2.42	0.84

Note. *Participants selected one of the four emotion quadrants and then rated the intensity of their emotional state, thus the percentages for each of the emotion quadrants reflects the frequency with which Ps experienced each emotional state.*

Table S10. Morning Physiological Reactivity as a Function of Stress

	Model Estimates					95% CI		Effect Size
	Estimate	*SE*	*DF*	*t*	*Sig*	Lower	Upper	*r**
Model 1 Fixed Effects								
SBP Reactivity ~								
Demands	0.89	0.05	2875.08	16.41	0.00	0.78	0.99	0.29
Resources	-0.15	0.05	2067.78	-2.86	0.00	-0.26	-0.05	0.06
Demands PM	-0.66	0.10	12331.75	-6.40	0.00	-0.86	-0.46	0.06
Resources PM	-0.13	0.10	10087.62	-1.30	0.19	-0.33	0.07	0.01
DBP Reactivity ~								
Demands	0.58	0.05	2994.34	12.51	0.00	0.49	0.67	0.22
Resources	-0.15	0.05	2115.37	-3.10	0.00	-0.24	-0.05	0.07
Demands PM	-0.54	0.09	12725.70	-5.93	0.00	-0.72	-0.36	0.05
Resources PM	-0.16	0.09	10484.97	-1.73	0.08	-0.33	0.02	0.02
HR Reactivity ~								
Demands	0.80	0.08	3216.30	10.67	0.00	0.66	0.95	0.18
Resources	0.08	0.07	2603.84	1.14	0.25	-0.06	0.23	0.02
Demands PM	0.02	0.12	11841.97	0.20	0.84	-0.21	0.26	0.00
Resources PM	-0.06	0.12	9457.36	-0.51	0.61	-0.29	0.17	0.01
Model 2 Fixed Effects								
SBP Reactivity ~	1.19	0.09	1162.62	13.70	0.00	1.02	1.36	0.37
Demands/Resources Ratio	-0.54	0.15	5327.93	-3.51	0.00	-0.84	-0.24	0.05
D/R Ratio PM								
DBP Reactivity ~	0.80	0.07	1076.22	10.92	0.00	0.66	0.94	0.32
Demands/Resources Ratio	-0.46	0.13	4942.35	-3.43	0.00	-0.72	-0.20	0.05
D/R Ratio PM								
HR Reactivity ~	0.78	0.11	943.17	7.13	0.00	0.56	0.99	0.23
Demands/Resources Ratio	0.32	0.17	4448.27	1.90	0.06	-0.01	0.66	0.03

Model 1 Random Effects	**SBP Reactivity**		**DBP Reactivity**		**HR Reactivity**	
	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Residual	32.20	0.35	24.77	0.27	61.18	0.66
Intercept (Var)	35.62	2.02	28.48	1.53	31.30	3.08
Demands (Var)	1.01	0.18	0.55	0.13	2.36	0.35
Resources (Var)	0.25	0.18	0.18	0.14	0.18	0.29
Intercept + Demands (Cov)	-0.32	0.49	-0.19	0.35	-2.39	0.88
Intercept + Resources (Cov)	0.16	0.53	0.33	0.39	-1.35	0.86
Demands + Resources (Cov)	-0.21	0.13	-0.18	0.09	0.23	0.24
Model 2 Random Effects						
Residual	32.94	0.34	25.18	0.26	62.77	0.63
Intercept (Var)	38.90	0.90	32.08	0.72	24.27	0.95
Demands/Resources Ratio (Var)	2.13	0.38	1.21	0.25	1.77	0.55

Intercept + Ratio (Cov)	-1.93	0.52	-1.66	0.39	0.49	0.68

	AIC			**BIC**		
	Demands only	Demands & Resources	D/R Ratio	Demands only	Demands & Resources	D/R Ratio
SBP	198831.5	198045.2	198261.2	198872.7	198103.1	198294.3
DBP	191386.0	190622.0	190761.6	191419.2	190680.0	190794.7
HR	211641.3	210863.4	211082.3	211682.4	210935.4	211082.3

Note: PM = person mean (aggregate of all responses for each participant)

$*r = \sqrt{(\frac{t^2}{t^2+df})}$

Table S11. Afternoon Physiological Reactivity as a Function of Stress

	Model Estimates					95% CI		Effect Size
Models 1 & 2	Estimate	*SE*	*DF*	*t*	*Sig*	Lower	Upper	*r**
Model 1 Fixed Effects								
SBP Reactivity ~								
Demands	0.28	0.03	4586.38	9.01	0.00	0.22	0.34	0.13
Resources	-0.28	0.03	4847.56	-8.83	0.00	-0.34	-0.21	0.13
Demands PM	-0.22	0.09	24148.14	-2.49	0.013	-0.40	-0.21	0.02
Resources PM	0.18	0.08	24204.08	2.01	0.044	0.005	0.35	0.01
DBP Reactivity ~								
Demands	0.28	0.03	145540.51	9.78	0.00	0.23	0.34	0.03
Resources	-0.17	0.03	188768.73	-5.94	0.00	-0.23	-0.12	0.01
Demands PM	-0.25	0.08	34424.12	-3.23	0.001	-0.41	-0.10	0.02
Resources PM	0.08	0.08	34485.46	1.07	0.28	-.07	0.23	0.01
HR Reactivity ~								
Demands	0.13	0.05	4775.19	2.77	.006	0.04	0.22	0.04
Resources	-0.18	0.05	5039.59	-3.85	0.00	-0.27	-0.09	0.05
Demands PM	-0.11	0.10	24418.51	-1.08	0.28	-0.32	0.09	0.01
Resources PM	-0.04	0.10	24716.01	-0.40	0.69	-0.24	0.16	0.00
Model 2 Fixed Effects								
SBP Reactivity ~								
Demands/Resources Ratio	0.54	0.03	2428.07	16.59	0.00	0.47	0.60	0.32
D/R Ratio PM	-0.36	0.07	16238.03	-4.89	0.00	-0.47	-0.21	0.04
DBP Reactivity ~								
Demands/Resources Ratio	0.39	0.03	2396.88	14.35	0.00	0.33	0.44	0.28
D/R Ratio PM	-0.29	0.07	16846.59	-4.63	0.00	-0.42	-0.17	0.04
HR Reactivity ~								
Demands/Resources Ratio	0.37	0.05	2766.41	8.21	0.00	0.28	0.46	0.15
D/R Ratio PM	0.07	0.08	15880.60	0.84	0.40	-0.09	0.23	0.01

Model 1 Random Effects	**SBP Reactivity**		**DBP Reactivity**		**HR Reactivity**	
	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Residual	34.47	0.18	21.75	0.10	73.36	0.37
Intercept (Var)	37.65	1.53	38.57	1.00	49.96	3.21
Demands (Var)	0.39	0.08	1.28	0.00	2.40	0.23
Resources (Var)	0.42	0.08	1.36	0.00	1.14	0.17
Intercept + Demands (Cov)	-0.41	0.30	-3.30	0.14	-4.98	0.77
Intercept + Resources (Cov)	-1.09	0.31	-4.35	0.13	-5.00	0.67
Demands + Resources (Cov)	-0.04	0.06	1.17	0.02	0.62	0.16
Model 2 Random Effects						
Residual	34.82	0.17	24.54	0.12	74.77	0.37
Intercept (Var)	34.92	0.53	28.36	0.41	27.23	0.59
D/R Ratio (Var)	0.64	0.08	0.42	0.05	1.02	0.14

Intercept + Ratio (Cov)	-0.53	0.18	-0.33	0.13	0.12	0.27

	AIC			BIC		
	Demands only	Demands & Resources	D/R Ratio	Demands only	Demands & Resources	D/R Ratio
SBP	669834.6	668402.3	668576.3	669872.6	668468.9	668614.4
DBP	636342.4	636026.0	635279.2	636380.5	636092.6	635317.3
HR	735785.4	734271.2	734349.9	735823.5	734337.8	734388.0

Note: PM = person mean (aggregate of all responses for each participant)

$*r = \sqrt{\left(\frac{t^2}{t^2+df}\right)}$

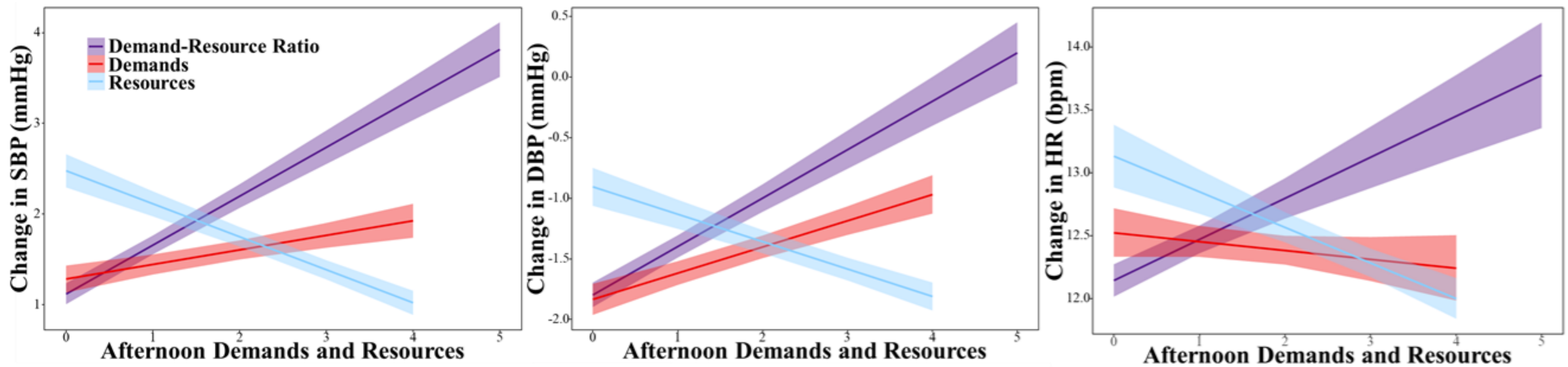

Figure S3. Overlay of afternoon demands and resources from Model 1 and afternoon ratio of demands to resources from Model 2.

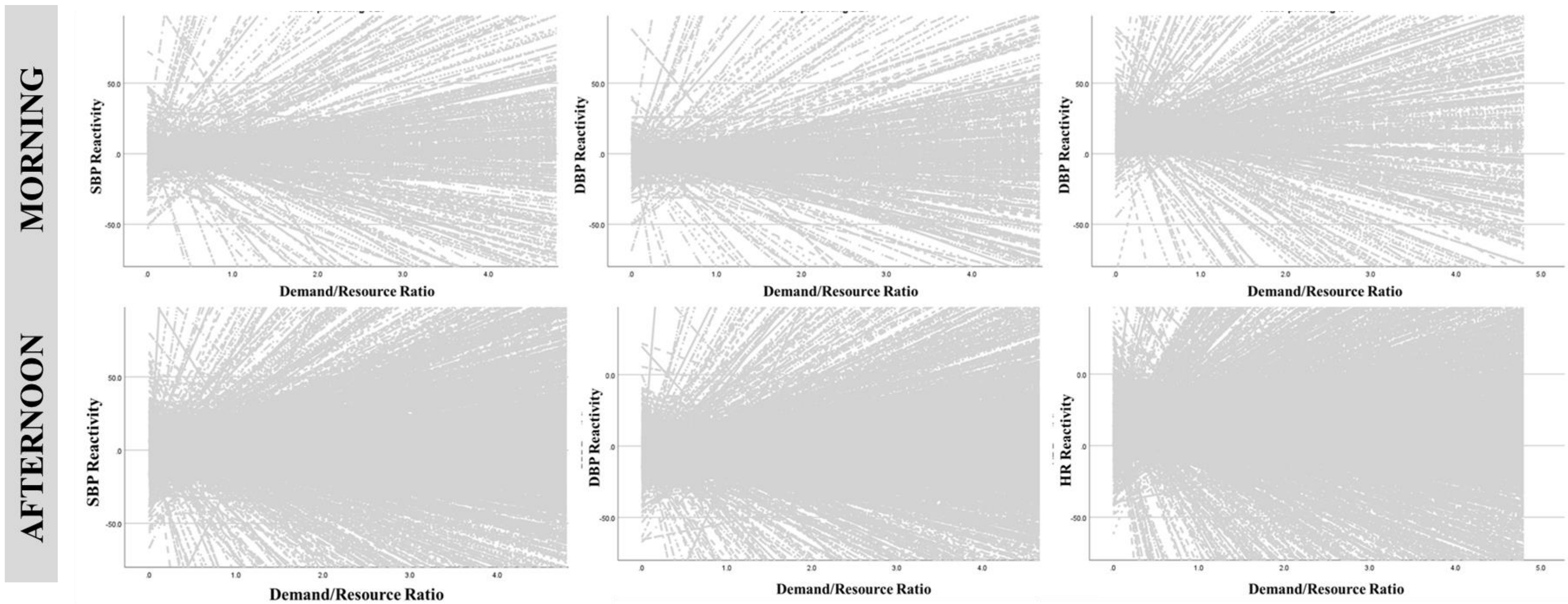

Figure S4. Spaghetti plots of individual slopes for morning and afternoon demands and resources ratio predicting physiological reactivity with 10% of the data (randomly selected).

Table S12. Age Moderations of the Association between Morning Stress and Physiological Reactivity

	Model Estimates					95% CI		Effect Size
Model	Estimate	*SE*	*DF*	*t*	*Sig*	Lower	Upper	*r**
Morning								
SBP Reactivity ~								
Demands/Resources Ratio	1.20	0.09	1178.88	13.82	0.00	1.03	1.37	0.37
D/R Ratio PM	-0.74	0.16	6077.46	-4.61	0.00	-1.05	-0.42	0.06
Age	-0.06	0.01	10293.77	-9.52	0.00	-0.07	-0.05	0.09
Age x D/R Ratio	0.02	0.01	1263.51	2.87	0.00	0.01	0.03	0.08
Age x D/R Ratio PM	-0.02	0.01	5567.13	-1.81	0.07	-0.05	0.00	0.02
DBP Reactivity ~								
Demands/Resources Ratio	0.81	0.07	1094.04	11.07	0.00	0.67	0.96	0.32
D/R Ratio PM	-0.56	0.14	5668.14	-3.97	0.00	-0.83	-0.28	0.05
Age	-0.03	0.01	10513.60	-6.15	0.00	-0.04	-0.02	0.06
Age x D/R Ratio	0.02	0.01	1182.94	2.46	0.01	0.00	0.03	0.07
Age x D/R Ratio PM	-0.01	0.01	5267.67	-0.99	0.32	-0.03	0.01	0.01
HR Reactivity ~								
Demands/Resources Ratio	0.77	0.11	942.30	7.05	0.00	0.56	0.98	0.22
D/R Ratio PM	0.19	0.17	4988.53	1.06	0.29	-0.16	0.53	0.01
Age	-0.04	0.01	8875.36	-7.19	0.00	-0.06	-0.03	0.08
Age x D/R Ratio	0.01	0.01	1058.62	1.21	0.23	-0.01	0.03	0.04
Age x D/R Ratio PM	-0.01	0.01	4806.35	-0.90	0.37	-0.04	0.02	0.01

Random Effects	**SBP Reactivity**		**DBP Reactivity**		**HR Reactivity**	
	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Residual	32.88	0.34	25.12	0.26	62.81	0.63
Intercept (Var)	36.96	0.75	30.45	0.60	24.98	0.75
D/R Ratio (Var)	2.10	0.37	1.22	0.25	1.75	0.54
Intercept + Ratio (Cov)	-0.74	0.43	-1.00	0.33	1.56	0.57

Note: PM = person mean (aggregate of all responses for each participant); age filtered to <91

$*r = \sqrt{(\frac{t^2}{t^2+df})}$

Table S13. Age Moderations of the Association between Afternoon Stress and Physiological Reactivity

	Model Estimates					95% CI		Effect Size
Model	Estimate	*SE*	*DF*	*t*	*Sig*	Lower	Upper	*r**
Morning								
SBP Reactivity ~								
Demands/Resources Ratio	0.55	0.03	2318.34	16.59	0.00	0.49	0.62	0.33
D/R Ratio PM	-0.50	0.08	16795.72	-6.43	0.00	-0.66	-0.35	0.05
Age	-0.07	0.00	17762.39	-17.13	0.00	-0.08	-0.06	0.13
Age x D/R Ratio	0.01	0.00	2398.80	2.33	0.02	0.00	0.01	0.05
Age x D/R Ratio PM	-0.01	0.01	17118.48	-1.52	0.13	-0.02	0.00	0.01
DBP Reactivity ~								
Demands/Resources Ratio	0.41	0.03	2282.05	15.01	0.00	0.36	0.47	0.30
D/R Ratio PM	-0.41	0.07	17350.57	-5.96	0.00	-0.54	-0.27	0.05
Age	-0.05	0.00	18069.21	-13.41	0.00	-0.06	-0.04	0.10
Age x D/R Ratio	0.01	0.00	2365.83	4.67	0.00	0.01	0.01	0.10
Age x D/R Ratio PM	-0.01	0.01	17677.64	-2.16	0.03	-0.02	0.00	0.02
HR Reactivity ~								
Demands/Resources Ratio	0.35	0.05	2615.85	7.39	0.00	0.25	0.44	0.14
D/R Ratio PM	0.05	0.09	16056.05	0.61	0.54	-0.12	0.23	0.00
Age	-0.02	0.00	15675.49	-3.93	0.00	-0.03	-0.01	0.03
Age x D/R Ratio	-0.01	0.00	2725.66	-3.12	0.00	-0.02	0.00	0.06
Age x D/R Ratio PM	0.01	0.01	16493.55	1.26	0.21	0.00	0.02	0.01

Random Effects	**SBP Reactivity**		**DBP Reactivity**		**HR Reactivity**	
	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Residual	34.82	0.17	24.54	0.12	74.76	0.37
Intercept (Var)	33.76	0.48	27.76	0.38	27.90	0.51
D/R Ratio (Var)	0.63	0.08	0.41	0.05	1.01	0.14
Intercept + Ratio (Cov)	-0.03	0.16	0.02	0.11	0.80	0.24

Note: PM = person mean (aggregate of all responses for each participant); age filtered to <91

$*r = \sqrt{(\frac{t^2}{t^2+df})}$

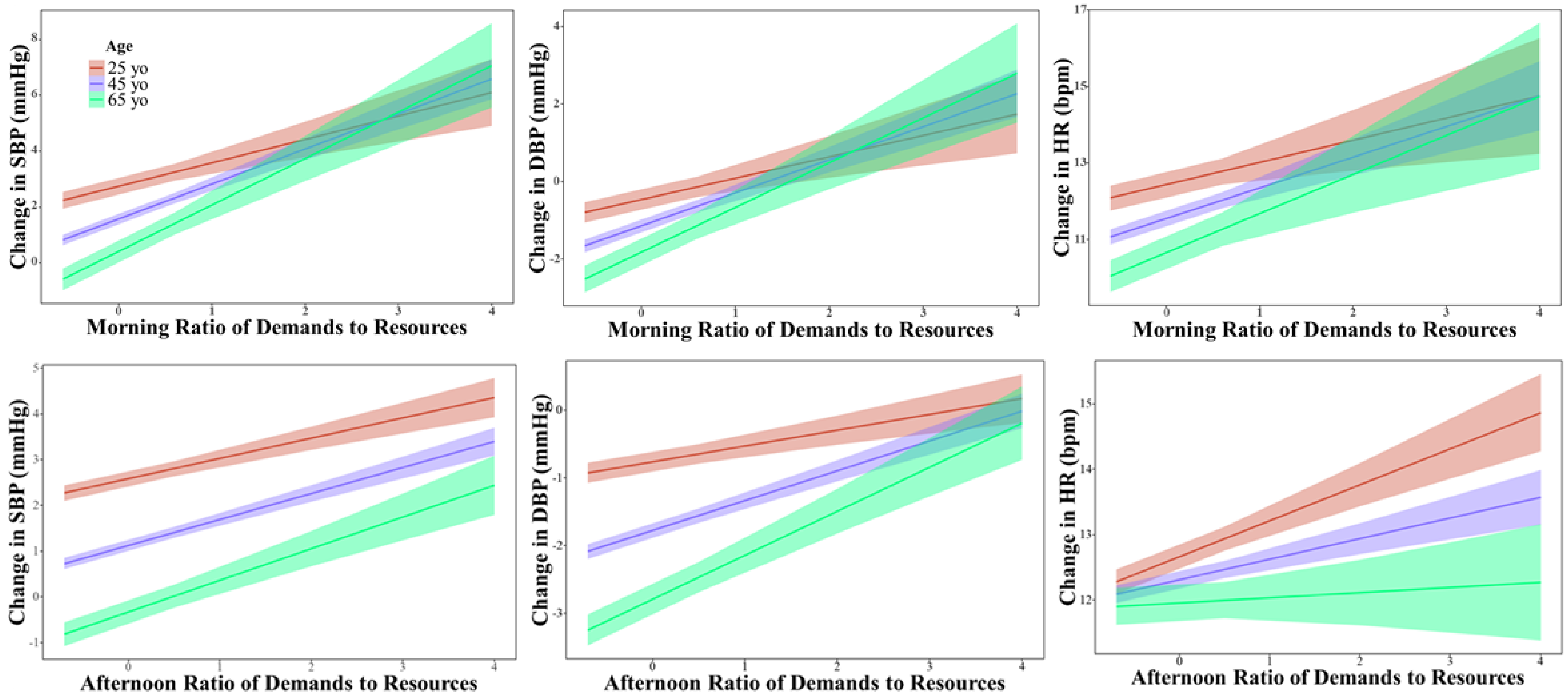

Figure S5. Ratio of demands to resources and physiologic responses moderated by age. *Row 1:* Morning demands to resources ratio: Both SBP and DBP moderations are significant. *Row 2:* Afternoon demands to resources ratio: SBP, DBP and HR moderations are all significant.

Table S14. Age Moderations of the Association between Morning Stress and Physiological Reactivity with Covariates

	Model Estimates					95% CI		Effect Size
Model	Estimate	*SE*	*DF*	*t*	*Sig*	Lower	Upper	*r**
SBP Reactivity ~								
Demands/Resources Ratio	1.27	0.09	1009.22	13.66	0.00	1.08	1.45	0.40
D/R Ratio PM	-0.59	0.18	6476.59	-3.32	0.00	-0.93	-0.24	0.04
Age	-0.06	0.01	10118.72	-9.30	0.00	-0.07	-0.05	0.09
Age x D/R Ratio	0.02	0.01	1251.65	2.49	0.01	0.00	0.03	0.07
Age x D/R Ratio PM	-0.02	0.01	5627.39	-1.90	0.06	-0.05	0.00	0.03
Sex	0.77	0.18	10038.02	4.33	0.00	0.42	1.12	0.04
Sex x D/R Ratio	-0.33	0.18	976.83	-1.78	0.08	-0.69	0.03	0.06
Sex x D/R Ratio PM	-0.13	0.33	4989.71	-0.41	0.68	-0.78	0.51	0.01
Health	0.14	0.09	10186.26	1.66	0.10	-0.03	0.31	0.02
Health x D/R Ratio	0.14	0.10	1112.28	1.41	0.16	-0.05	0.32	0.04
Health x D/R Ratio PM	0.06	0.17	4599.76	0.35	0.73	-0.27	0.39	0.01
Education	-0.05	0.05	10409.88	-1.02	0.31	-0.16	0.05	0.01
Education x D/R Ratio	0.07	0.06	1150.55	1.12	0.26	-0.05	0.20	0.03
Education x D/R Ratio PM	-0.01	0.11	5048.99	-0.06	0.95	-0.22	0.21	0.00
DBP Reactivity ~								
Demands/Resources Ratio	0.88	0.08	933.95	11.18	0.00	0.72	1.03	0.34
D/R Ratio PM	-0.49	0.15	6085.29	-3.19	0.00	-0.80	-0.19	0.04
Age	-0.03	0.01	10323.43	-5.88	0.00	-0.04	-0.02	0.06
Age x D/R Ratio	0.01	0.01	1167.44	2.21	0.03	0.00	0.03	0.06
Age x D/R Ratio PM	-0.01	0.01	5309.46	-0.99	0.32	-0.03	0.01	0.01
Sex	0.87	0.16	10206.88	5.42	0.00	0.55	1.18	0.05
Sex x D/R Ratio	-0.34	0.16	900.50	-2.21	0.03	-0.65	-0.04	0.07
Sex x D/R Ratio PM	0.12	0.29	4596.23	0.42	0.68	-0.44	0.68	0.01
Health	0.04	0.08	10372.15	0.57	0.57	-0.11	0.20	0.01
Health x D/R Ratio	0.11	0.08	1030.66	1.29	0.20	-0.05	0.27	0.04
Health x D/R Ratio PM	-0.02	0.15	4298.93	-0.11	0.91	-0.30	0.27	0.00
Education	-0.09	0.05	10577.37	-1.84	0.07	-0.18	0.01	0.02
Education x D/R Ratio	0.06	0.05	1057.13	1.08	0.28	-0.05	0.17	0.03
Education x D/R Ratio PM	-0.04	0.10	4665.78	-0.47	0.64	-0.23	0.14	0.01
HR Reactivity ~								
Demands/Resources Ratio	0.69	0.12	775.10	6.01	0.00	0.47	0.92	0.21
D/R Ratio PM	0.23	0.19	5185.44	1.20	0.23	-0.14	0.60	0.02
Age	-0.04	0.01	8738.14	-7.08	0.00	-0.06	-0.03	0.08
Age x D/R Ratio	0.01	0.01	1007.11	0.75	0.45	-0.01	0.03	0.02
Age x D/R Ratio PM	-0.02	0.01	4658.87	-1.11	0.27	-0.04	0.01	0.02
Sex	-0.52	0.18	8746.41	-2.89	0.00	-0.86	-0.17	0.03
Sex x D/R Ratio	0.57	0.23	749.77	2.47	0.01	0.12	1.02	0.09

Sex x D/R Ratio PM	-0.46	0.36	4071.27	-1.28	0.20	-1.17	0.24	0.02
Health	-0.09	0.09	8828.79	-1.07	0.28	-0.26	0.08	0.01
Health x D/R Ratio	0.06	0.12	861.18	0.47	0.64	-0.18	0.29	0.02
Health x D/R Ratio PM	0.18	0.18	3776.33	1.00	0.32	-0.18	0.55	0.02
Education	0.03	0.05	9224.72	0.57	0.57	-0.07	0.14	0.01
Education x D/R Ratio	0.05	0.08	882.55	0.56	0.58	-0.11	0.20	0.02
Education x D/R Ratio PM	-0.03	0.12	3949.52	-0.26	0.80	-0.27	0.21	0.00

Note: PM = person mean (aggregate of all responses for each participant); sex coded -.5 = female, .5 = male; age filtered to <91; random effects for these models differ by less than a point from random effects for model with age only as a moderator.

$*r = \sqrt{(\frac{t^2}{t^2+df})}$

Table S15. Age Moderations of the Association between Afternoon Stress and Physiological Reactivity with Covariates

	Model Estimates					95% CI		Effect Size
Model	Estimate	*SE*	*DF*	*t*	*Sig*	Lower	Upper	*r**
SBP Reactivity ~								
Demands/Resources Ratio	0.56	0.04	2052.68	15.69	0.00	0.49	0.63	0.33
D/R Ratio PM	-0.37	0.09	16703.11	-4.27	0.00	-0.54	-0.20	0.03
Age	-0.07	0.00	17339.66	-17.16	0.00	-0.08	-0.07	0.13
Age x D/R Ratio	0.01	0.00	2397.43	2.19	0.03	0.00	0.01	0.04
Age x D/R Ratio PM	-0.01	0.01	16669.22	-1.64	0.10	-0.02	0.00	0.01
Sex	0.60	0.13	17224.29	4.65	0.00	0.35	0.85	0.04
Sex x D/R Ratio	0.07	0.07	2038.70	1.01	0.31	-0.07	0.20	0.02
Sex x D/R Ratio PM	-0.38	0.16	15410.67	-2.43	0.02	-0.69	-0.07	0.02
Health	0.11	0.06	17707.66	1.83	0.07	-0.01	0.23	0.01
Health x D/R Ratio	0.11	0.04	2361.84	3.12	0.00	0.04	0.18	0.06
Health x D/R Ratio PM	0.05	0.08	14902.43	0.67	0.51	-0.10	0.21	0.01
Education	0.04	0.04	18079.10	1.08	0.28	-0.03	0.11	0.01
Education x D/R Ratio	-0.01	0.02	2576.80	-0.30	0.77	-0.05	0.04	0.01
Education x D/R Ratio PM	0.07	0.05	16560.96	1.40	0.16	-0.03	0.18	0.01
DBP Reactivity ~								
Demands/Resources Ratio	0.42	0.03	2038.28	14.41	0.00	0.37	0.48	0.30
D/R Ratio PM	-0.34	0.08	17248.90	-4.50	0.00	-0.49	-0.19	0.03
Age	-0.05	0.00	17642.31	-13.41	0.00	-0.06	-0.04	0.10
Age x D/R Ratio	0.01	0.00	2386.40	4.35	0.00	0.01	0.01	0.09
Age x D/R Ratio PM	-0.01	0.01	17272.99	-2.12	0.03	-0.02	0.00	0.02
Sex	0.45	0.11	17519.95	3.89	0.00	0.22	0.67	0.03
Sex x D/R Ratio	0.01	0.06	2025.65	0.12	0.91	-0.11	0.12	0.00
Sex x D/R Ratio PM	-0.19	0.14	16048.84	-1.36	0.17	-0.46	0.08	0.01
Health	0.06	0.05	17972.46	1.20	0.23	-0.04	0.17	0.01
Health x D/R Ratio	0.07	0.03	2352.36	2.35	0.02	0.01	0.13	0.05
Health x D/R Ratio PM	0.02	0.07	15607.14	0.27	0.79	-0.12	0.15	0.00
Education	0.01	0.03	18311.88	0.31	0.76	-0.05	0.07	0.00
Education x D/R Ratio	0.02	0.02	2573.44	0.92	0.36	-0.02	0.06	0.02
Education x D/R Ratio PM	0.04	0.05	17209.88	0.82	0.41	-0.05	0.13	0.01
HR Reactivity ~								
Demands/Resources Ratio	0.34	0.05	2308.74	6.80	0.00	0.24	0.44	0.14
D/R Ratio PM	0.04	0.10	16043.19	0.37	0.71	-0.15	0.23	0.00
Age	-0.02	0.00	15275.24	-3.91	0.00	-0.03	-0.01	0.03
Age x D/R Ratio	-0.01	0.00	2718.92	-2.93	0.00	-0.02	0.00	0.06
Age x D/R Ratio PM	0.01	0.01	16094.83	1.09	0.28	-0.01	0.02	0.01
Sex	-0.21	0.13	15255.33	-1.54	0.12	-0.47	0.06	0.01
Sex x D/R Ratio	0.09	0.10	2307.16	0.93	0.35	-0.10	0.28	0.02

Sex x D/R Ratio PM	-0.13	0.18	14962.53	-0.72	0.47	-0.48	0.23	0.01
Health	-0.12	0.06	15892.28	-1.96	0.05	-0.25	0.00	0.02
Health x D/R Ratio	0.04	0.05	2692.59	0.76	0.45	-0.06	0.14	0.01
Health x D/R Ratio PM	0.03	0.09	14496.99	0.37	0.71	-0.15	0.21	0.00
Education	0.01	0.04	16467.60	0.19	0.85	-0.07	0.08	0.00
Education x D/R Ratio	-0.08	0.03	2950.43	-2.23	0.03	-0.14	-0.01	0.04
Education x D/R Ratio PM	-0.01	0.06	16224.59	-0.09	0.93	-0.13	0.12	0.00

Note: PM = person mean (aggregate of all responses for each participant); sex coded -.5 = female, .5 = male; age filtered to <91; random effects for these models differ by less than a point from random effects for model with age only as a moderator.

$*r = \sqrt{(\frac{t^2}{t^2+df})}$

Table S16. Physiological Reactivity as a Function of Emotion Intensity by Valence and Arousal

	Model Estimates					95% CI		Effect Size
Model 3 Fixed Effects	Estimate	*SE*	*DF*	*t*	*Sig*	Lower	Upper	*r**
High Arousal Negative								
SBP Reactivity ~								
Emotion Intensity	0.68	0.11	1012.71	6.20	0.00	0.47	0.90	0.19
Emotion Intensity PM	-0.38	0.18	4978.92	-2.10	0.04	-0.74	-0.03	0.03
DBP Reactivity ~								
Emotion Intensity	0.38	0.09	780.29	4.13	0.00	0.20	0.55	0.15
Emotion Intensity PM	-0.39	0.16	4405.81	-2.54	0.01	-0.70	-0.09	0.04
HR Reactivity ~								
Emotion Intensity	0.66	0.16	1260.99	4.18	0.00	0.35	0.97	0.12
Emotion Intensity PM	0.45	0.23	4557.85	1.95	0.05	0.00	0.89	0.03
Low Arousal Negative								
SBP Reactivity ~								
Emotion Intensity	0.16	0.11	852.09	1.40	0.16	-0.06	0.38	0.05
Emotion Intensity PM	-0.12	0.18	4025.94	-0.71	0.48	-0.47	0.22	0.01
DBP Reactivity ~								
Emotion Intensity	-0.01	0.09	702.01	-0.07	0.95	-0.18	0.17	0.00
Emotion Intensity PM	-0.07	0.15	3914.06	-0.46	0.65	-0.36	0.22	0.01
HR Reactivity ~								
Emotion Intensity	0.45	0.18	1504.74	2.52	0.01	0.10	0.79	0.06
Emotion Intensity PM	0.41	0.23	4618.15	1.75	0.08	-0.05	0.87	0.03
Low Arousal Positive								
SBP Reactivity ~								
Emotion Intensity	-0.39	0.05	3096.27	-7.32	0.00	-0.50	-0.29	0.13
Emotion Intensity PM	0.22	0.11	16246.31	1.99	0.05	0.00	0.44	0.02
DBP Reactivity ~								
Emotion Intensity	-0.37	0.04	2924.54	-8.41	0.00	-0.46	-0.28	0.15
Emotion Intensity PM	0.25	0.10	16449.87	2.54	0.01	0.06	0.44	0.02
HR Reactivity ~								
Emotion Intensity	-0.14	0.08	3598.36	-1.76	0.08	-0.29	0.02	0.03
Emotion Intensity PM	0.17	0.13	15412.50	1.27	0.21	-0.09	0.42	0.01
High Arousal Positive								
SBP Reactivity ~								
Emotion Intensity	0.10	0.07	1821.55	1.43	0.15	-0.04	0.23	0.03
Emotion Intensity PM	-0.47	0.14	10187.01	-3.45	0.00	-0.74	-0.20	0.03
DBP Reactivity ~								
Emotion Intensity	-0.14	0.06	1786.97	-2.41	0.02	-0.25	-0.03	0.06
Emotion Intensity PM	-0.31	0.12	10431.80	-2.59	0.01	-0.54	-0.07	0.03
HR Reactivity ~								
Emotion Intensity	0.79	0.10	2192.46	7.90	0.00	0.60	0.99	0.17
Emotion Intensity PM	-0.36	0.16	9214.86	-2.21	0.03	-0.68	-0.04	0.02

Model 3 Random Effects	**SBP Reactivity**		**DBP Reactivity**		**HR Reactivity**	
High Arousal Negative	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Residual	38.38	0.69	27.30	0.50	81.10	1.43
Intercept (Var)	39.76	3.07	31.49	2.36	35.53	5.12
Emotion Intensity (Var)	1.29	0.51	0.60	0.37	2.27	0.90
Intercept + Emotion (Cov)	-0.75	1.11	-0.24	0.85	-2.49	2.03
Low Arousal Negative						
Residual	33.80	0.66	23.22	0.45	78.97	1.45
Intercept (Var)	36.36	2.90	30.02	2.14	29.57	4.57
Emotion Intensity (Var)	0.80	0.45	0.09	0.27	3.99	0.99
Intercept + Emotion (Cov)	0.28	1.05	0.74	0.70	-3.81	2.02
Low Arousal Positive						
Residual	32.86	0.26	23.41	0.18	69.12	0.53
Intercept (Var)	36.63	1.52	28.94	1.09	32.63	2.44
Emotion Intensity (Var)	0.65	0.19	0.18	0.12	1.19	0.36
Intercept + Emotion (Cov)	-1.11	0.49	-0.13	0.32	-2.79	0.89
High Arousal Positive						
Residual	32.55	0.33	23.30	0.23	71.52	0.71
Intercept (Var)	40.11	2.28	31.51	1.66	33.97	3.82
Emotion Intensity (Var)	0.60	0.26	0.39	0.18	1.41	0.52
Intercept + Emotion (Cov)	-0.32	0.69	-0.05	0.49	-1.60	1.34

Note: PM = person mean (aggregate of all responses for each participant)

$*r = \sqrt{(\frac{t^2}{t^2+df})}$

Table S17. Age Moderations of the Association between Emotion Intensity and Physiological Reactivity

	Model Estimates					95% CI		Effect Size
Model	Estimate	*SE*	*DF*	*t*	Sig	Lower	Upper	*r**
High Arousal Negative								
SBP Reactivity ~								
Emotion Intensity	0.69	0.11	994.60	6.20	0.00	0.47	0.91	0.19
Emotion Intensity PM	-0.31	0.19	5103.30	-1.64	0.10	-0.69	0.06	0.02
Age	-0.12	0.03	5698.74	-4.17	0.00	-0.17	-0.06	0.06
Age x Emotion Intensity	0.01	0.01	829.36	0.80	0.42	-0.01	0.03	0.03
Age x Emotion Intensity PM	0.01	0.02	4451.14	0.81	0.42	-0.02	0.04	0.01
DBP Reactivity ~								
Emotion Intensity	0.37	0.09	798.35	3.96	0.00	0.19	0.55	0.14
Emotion Intensity PM	-0.33	0.16	4681.00	-2.02	0.04	-0.65	-0.01	0.03
Age	-0.07	0.02	5700.03	-2.92	0.00	-0.12	-0.02	0.04
Age x Emotion Intensity	0.00	0.01	642.27	-0.61	0.54	-0.02	0.01	0.02
Age x Emotion Intensity PM	0.02	0.01	3972.32	1.41	0.16	-0.01	0.05	0.02
HR Reactivity ~								
Emotion Intensity	0.72	0.16	1216.14	4.48	0.00	0.40	1.03	0.13
Emotion Intensity PM	0.39	0.24	4610.95	1.64	0.10	-0.08	0.86	0.02
Age	-0.06	0.03	5088.36	-1.73	0.08	-0.12	0.01	0.02
Age x Emotion Intensity	0.04	0.01	990.52	2.90	0.00	0.01	0.07	0.09
Age x Emotion Intensity PM	-0.04	0.02	3840.60	-1.92	0.06	-0.08	0.00	0.03
Low Arousal Negative								
SBP Reactivity ~								
Emotion Intensity	0.15	0.12	964.85	1.19	0.23	-0.09	0.39	0.04
Emotion Intensity PM	-0.08	0.20	4626.41	-0.40	0.69	-0.46	0.31	0.01
Age	-0.08	0.03	5323.55	-2.93	0.00	-0.13	-0.03	0.04
Age x Emotion Intensity	0.00	0.01	853.83	-0.20	0.85	-0.02	0.02	0.01
Age x Emotion Intensity PM	0.01	0.02	4187.27	0.74	0.46	-0.02	0.04	0.01
DBP Reactivity ~								
Emotion Intensity	-0.01	0.10	860.45	-0.13	0.89	-0.21	0.18	0.00
Emotion Intensity PM	-0.04	0.17	4707.95	-0.24	0.81	-0.37	0.29	0.00
Age	-0.04	0.02	5396.58	-1.70	0.09	-0.08	0.01	0.02
Age x Emotion Intensity	0.00	0.01	665.58	-0.20	0.84	-0.02	0.01	0.01
Age x Emotion Intensity PM	0.01	0.01	3928.09	0.50	0.61	-0.02	0.03	0.01
HR Reactivity ~								
Emotion Intensity	0.45	0.19	1626.15	2.31	0.02	0.07	0.83	0.06
Emotion Intensity PM	0.50	0.26	5169.60	1.93	0.05	-0.01	1.01	0.03
Age	-0.05	0.03	5007.21	-1.65	0.10	-0.11	0.01	0.02
Age x Emotion Intensity	0.00	0.02	1508.35	0.03	0.98	-0.03	0.03	0.00
Age x Emotion Intensity PM	0.02	0.02	4806.14	0.81	0.42	-0.02	0.06	0.01

Low Arousal Positive								
SBP Reactivity ~								
Emotion Intensity	-0.40	0.05	3022.61	-7.35	0.00	-0.50	-0.29	0.13
Emotion Intensity PM	0.26	0.11	15901.33	2.25	0.02	0.03	0.48	0.02
Age	-0.09	0.02	13171.54	-4.87	0.00	-0.12	-0.05	0.04
Age x Emotion Intensity	-0.01	0.00	2838.82	-1.78	0.07	-0.02	0.00	0.03
Age x Emotion Intensity PM	0.01	0.01	15723.19	1.41	0.16	0.00	0.03	0.01
DBP Reactivity ~								
Emotion Intensity	-0.37	0.04	2851.21	-8.46	0.00	-0.46	-0.29	0.16
Emotion Intensity PM	0.25	0.10	16110.14	2.50	0.01	0.05	0.45	0.02
Age	-0.05	0.02	13432.21	-3.02	0.00	-0.08	-0.02	0.03
Age x Emotion Intensity	-0.01	0.00	2645.52	-1.51	0.13	-0.01	0.00	0.03
Age x Emotion Intensity PM	0.00	0.01	15917.92	0.25	0.80	-0.01	0.02	0.00
HR Reactivity ~								
Emotion Intensity	-0.13	0.08	3509.05	-1.73	0.08	-0.29	0.02	0.03
Emotion Intensity PM	0.19	0.13	14988.61	1.47	0.14	-0.07	0.45	0.01
Age	-0.03	0.02	11011.07	-1.52	0.13	-0.07	0.01	0.01
Age x Emotion Intensity	0.00	0.01	3294.69	0.64	0.53	-0.01	0.02	0.01
Age x Emotion Intensity PM	0.00	0.01	14705.40	0.47	0.64	-0.02	0.02	0.00
High Arousal Positive								
SBP Reactivity ~								
Emotion Intensity	0.09	0.07	1820.84	1.37	0.17	-0.04	0.23	0.03
Emotion Intensity PM	-0.34	0.14	10171.91	-2.46	0.01	-0.60	-0.07	0.02
Age	-0.09	0.02	8895.95	-3.79	0.00	-0.13	-0.04	0.04
Age x Emotion Intensity	-0.01	0.01	1944.52	-2.26	0.02	-0.02	0.00	0.05
Age x Emotion Intensity PM	0.01	0.01	10510.20	1.00	0.32	-0.01	0.03	0.01
DBP Reactivity ~								
Emotion Intensity	-0.14	0.06	1752.44	-2.45	0.01	-0.25	-0.03	0.06
Emotion Intensity PM	-0.23	0.12	10378.60	-1.92	0.05	-0.46	0.00	0.02
Age	-0.04	0.02	9106.74	-2.18	0.03	-0.08	0.00	0.02
Age x Emotion Intensity	-0.02	0.00	1881.31	-3.47	0.00	-0.02	-0.01	0.08
Age x Emotion Intensity PM	0.01	0.01	10718.46	0.92	0.36	-0.01	0.03	0.01
HR Reactivity ~								
Emotion Intensity	0.79	0.10	2176.36	7.83	0.00	0.59	0.98	0.17
Emotion Intensity PM	-0.26	0.16	9163.32	-1.58	0.11	-0.58	0.06	0.02
Age	-0.07	0.03	7485.19	-2.64	0.01	-0.12	-0.02	0.03
Age x Emotion Intensity	0.00	0.01	2325.82	0.25	0.80	-0.01	0.02	0.01
Age x Emotion Intensity PM	0.00	0.01	9627.06	0.28	0.78	-0.02	0.03	0.00

Model 3 Random Effects	**SBP Reactivity**		**DBP Reactivity**		**HR Reactivity**	
High Arousal Negative	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Residual	38.38	0.69	27.29	0.50	81.31	1.44
Intercept (Var)	38.56	3.06	31.23	2.35	32.72	5.10
Emotion Intensity (Var)	1.29	0.51	0.63	0.37	2.04	0.90

Intercept + Emotion (Cov)	-0.60	1.12	-0.24	0.85	-1.67	2.03
Low Arousal Negative						
Residual	33.81	0.66	23.22	0.45	79.07	1.46
Intercept (Var)	36.01	2.90	29.94	2.13	29.42	4.60
Emotion Intensity (Var)	0.83	0.46	0.11	0.27	4.01	0.99
Intercept + Emotion (Cov)	0.24	1.05	0.72	0.70	-3.80	2.03
Low Arousal Positive						
Residual	32.86	0.26	23.39	0.18	69.12	0.53
Intercept (Var)	35.89	1.51	28.66	1.09	32.24	2.44
Emotion Intensity (Var)	0.63	0.19	0.17	0.12	1.18	0.36
Intercept + Emotion (Cov)	-1.10	0.48	-0.15	0.32	-2.71	0.89
High Arousal Positive						
Residual	32.50	0.33	23.32	0.23	71.56	0.72
Intercept (Var)	39.29	2.25	31.10	1.64	33.15	3.81
Emotion Intensity (Var)	0.59	0.26	0.34	0.18	1.36	0.52
Intercept + Emotion (Cov)	-0.38	0.69	-0.01	0.49	-1.48	1.33

Note: PM = person mean (aggregate of all responses for each participant); age filtered to <91

$$*r = \sqrt{(\frac{t^2}{t^2+df})}$$

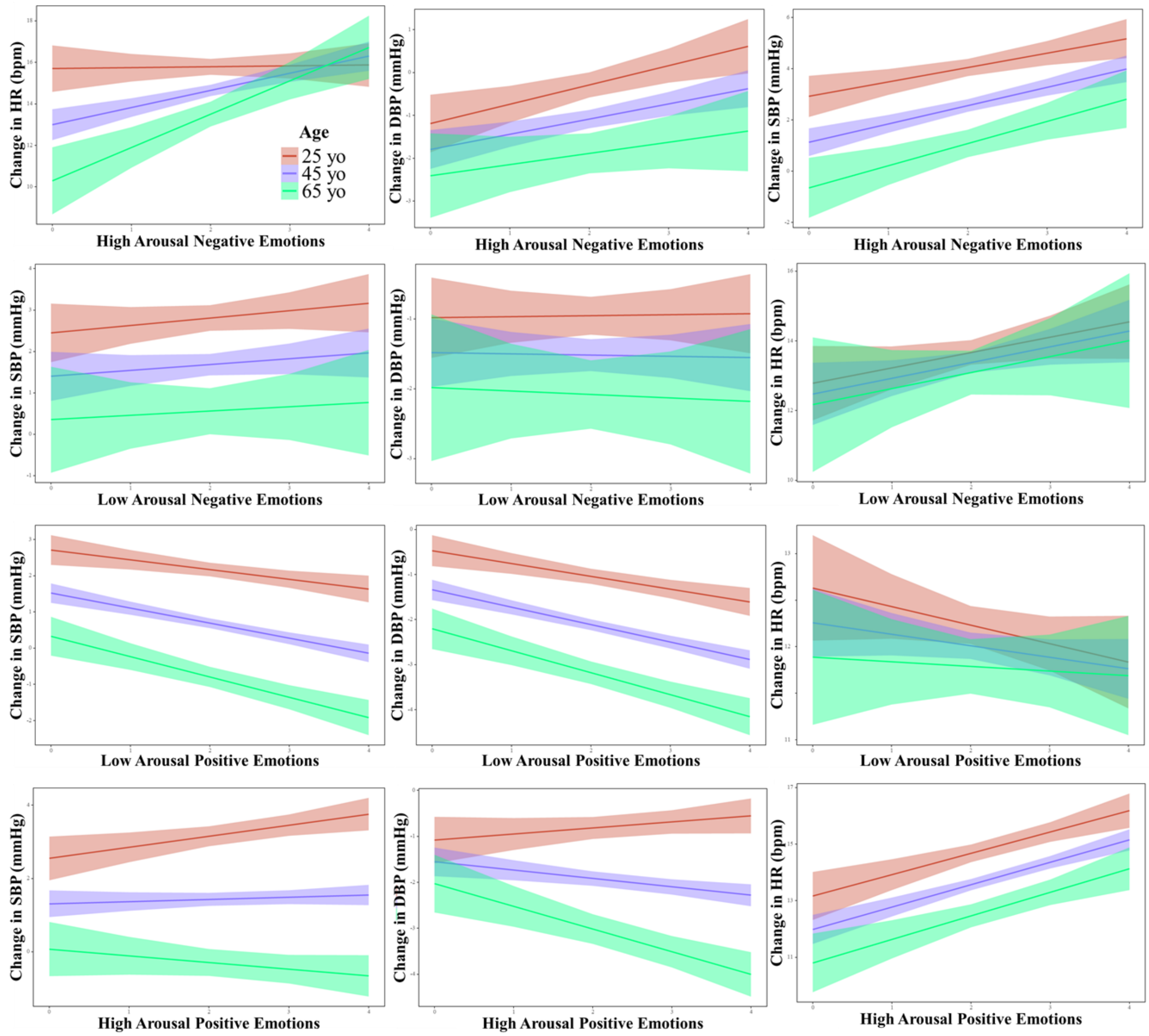

Figure S6. Intensity of daily emotions and physiologic responses moderated by age. *Row 1*: High arousal negative emotions (e.g., anger, fear, disgust), *Row 2*: Low arousal negative emotions (e.g., sad, bored), *Row 3*: Low arousal positive emotions (e.g., calm, content), *Row 4:* High arousal positive emotions (e.g., excitement, joy).

Table S18. Age Moderations of the Association between Emotion Intensity and Physiological Reactivity with Covariates

	Model Estimates					95% CI		Effect Size
Model	Estimate	SE	*DF*	*t*	*Sig*	Lower	Upper	*r**
High Arousal Negative								
SBP Reactivity ~								
Emotion Intensity	0.65	0.12	886.89	5.46	0.00	0.42	0.89	0.18
Emotion Intensity PM	-0.16	0.21	4936.18	-0.78	0.44	-0.57	0.25	0.01
Age	-0.12	0.03	5570.72	-4.23	0.00	-0.18	-0.06	0.06
Age x Emotion Intensity	0.01	0.01	833.72	0.72	0.47	-0.01	0.03	0.02
Age x Emotion Intensity PM	0.01	0.02	4438.40	0.89	0.37	-0.02	0.05	0.01
Sex	0.56	0.72	5608.63	0.77	0.44	-0.86	1.98	0.01
Sex x Emotion Intensity	0.21	0.23	890.27	0.89	0.37	-0.25	0.66	0.03
Sex x Emotion Intensity PM	-0.16	0.40	4862.08	-0.41	0.68	-0.94	0.62	0.01
Health	0.12	0.36	5651.59	0.34	0.73	-0.59	0.84	0.00
Health x Emotion Intensity	0.03	0.12	973.84	0.21	0.83	-0.22	0.27	0.01
Health x Emotion Intensity PM	0.06	0.21	4913.75	0.31	0.76	-0.34	0.47	0.00
Education	0.12	0.23	5626.37	0.51	0.61	-0.33	0.57	0.01
Education x Emotion Intensity	0.02	0.08	960.25	0.28	0.78	-0.14	0.19	0.01
Education x Emotion Intensity PM	-0.10	0.14	4485.03	-0.74	0.46	-0.37	0.17	0.01
DBP Reactivity ~								
Emotion Intensity	0.35	0.10	671.79	3.51	0.00	0.15	0.54	0.13
Emotion Intensity PM	-0.19	0.18	4426.85	-1.05	0.30	-0.54	0.16	0.02
Age	-0.07	0.02	5566.94	-2.80	0.01	-0.12	-0.02	0.04
Age x Emotion Intensity	-0.01	0.01	613.32	-0.88	0.38	-0.02	0.01	0.04
Age x Emotion Intensity PM	0.02	0.01	3865.30	1.45	0.15	-0.01	0.05	0.02
Sex	0.76	0.63	5605.78	1.20	0.23	-0.48	2.00	0.02
Sex x Emotion Intensity	0.02	0.19	672.76	0.10	0.92	-0.35	0.39	0.00
Sex x Emotion Intensity PM	-0.28	0.34	4329.03	-0.83	0.41	-0.95	0.38	0.01
Health	-0.04	0.32	5637.40	-0.13	0.90	-0.66	0.58	0.00
Health x Emotion Intensity	-0.01	0.10	739.86	-0.14	0.89	-0.21	0.19	0.01
Health x Emotion Intensity PM	0.11	0.18	4350.14	0.65	0.52	-0.23	0.46	0.01
Education	-0.10	0.20	5610.32	-0.51	0.61	-0.49	0.29	0.01
Education x Emotion Intensity	0.10	0.07	719.85	1.42	0.16	-0.04	0.23	0.05
Education x Emotion Intensity PM	-0.05	0.12	3917.14	-0.47	0.64	-0.28	0.17	0.01
HR Reactivity ~								
Emotion Intensity	0.66	0.17	1079.06	3.87	0.00	0.33	1.00	0.12
Emotion Intensity PM	0.44	0.26	4402.85	1.71	0.09	-0.06	0.95	0.03
Age	-0.07	0.03	4972.59	-2.04	0.04	-0.13	0.00	0.03
Age x Emotion Intensity	0.04	0.01	996.23	2.64	0.01	0.01	0.06	0.08

Age x Emotion Intensity PM	-0.03	0.02	3820.81	-1.49	0.14	-0.07	0.01	0.02
Sex	0.24	0.83	4983.99	0.29	0.77	-1.38	1.86	0.00
Sex x Emotion Intensity	0.44	0.33	1083.13	1.32	0.19	-0.21	1.09	0.04
Sex x Emotion Intensity PM	-0.25	0.49	4352.88	-0.50	0.62	-1.21	0.72	0.01
Health	0.20	0.42	5124.37	0.47	0.64	-0.62	1.01	0.01
Health x Emotion Intensity	0.02	0.18	1176.63	0.13	0.90	-0.32	0.37	0.00
Health x Emotion Intensity PM	-0.12	0.26	4385.60	-0.48	0.63	-0.63	0.38	0.01
Education	0.50	0.26	5147.66	1.90	0.06	-0.02	1.02	0.03
Education x Emotion Intensity	0.09	0.12	1157.38	0.75	0.46	-0.15	0.33	0.02
Education x Emotion Intensity PM	-0.37	0.17	3980.43	-2.19	0.03	-0.71	-0.04	0.03
Low Arousal Negative								
SBP Reactivity ~								
Emotion Intensity	0.12	0.14	841.24	0.90	0.37	-0.14	0.39	0.03
Emotion Intensity PM	-0.01	0.22	4287.39	-0.06	0.95	-0.44	0.42	0.00
Age	-0.07	0.03	5228.60	-2.80	0.01	-0.13	-0.02	0.04
Age x Emotion Intensity	0.00	0.01	800.87	-0.21	0.83	-0.02	0.02	0.01
Age x Emotion Intensity PM	0.01	0.02	4021.18	0.66	0.51	-0.02	0.04	0.01
Sex	-0.11	0.68	5224.90	-0.16	0.87	-1.45	1.22	0.00
Sex x Emotion Intensity	0.46	0.24	717.96	1.93	0.05	-0.01	0.92	0.07
Sex x Emotion Intensity PM	0.00	0.39	3958.59	-0.01	0.99	-0.77	0.76	0.00
Health	-0.34	0.33	5260.92	-1.03	0.30	-0.98	0.30	0.01
Health x Emotion Intensity	0.10	0.12	657.91	0.81	0.42	-0.14	0.34	0.03
Health x Emotion Intensity PM	0.21	0.19	3317.03	1.09	0.28	-0.17	0.59	0.02
Education	-0.35	0.21	5121.42	-1.65	0.10	-0.76	0.06	0.02
Education x Emotion Intensity	-0.04	0.08	836.55	-0.53	0.60	-0.21	0.12	0.02
Education x Emotion Intensity PM	0.21	0.13	3766.62	1.63	0.10	-0.04	0.46	0.03
DBP Reactivity ~								
Emotion Intensity	-0.02	0.11	744.73	-0.21	0.84	-0.24	0.19	0.01
Emotion Intensity PM	0.01	0.19	4362.92	0.06	0.95	-0.35	0.38	0.00
Age	-0.04	0.02	5300.80	-1.55	0.12	-0.08	0.01	0.02
Age x Emotion Intensity	0.00	0.01	653.03	-0.38	0.70	-0.02	0.01	0.02
Age x Emotion Intensity PM	0.01	0.01	3884.89	0.51	0.61	-0.02	0.03	0.01
Sex	-0.17	0.60	5305.68	-0.29	0.77	-1.34	1.00	0.00
Sex x Emotion Intensity	0.38	0.19	620.70	2.00	0.05	0.01	0.75	0.08
Sex x Emotion Intensity PM	-0.08	0.33	4005.19	-0.23	0.81	-0.73	0.57	0.00
Health	-0.40	0.29	5334.69	-1.38	0.17	-0.96	0.17	0.02
Health x Emotion Intensity	0.10	0.10	504.14	1.06	0.29	-0.09	0.29	0.05
Health x Emotion Intensity PM	0.13	0.17	3112.11	0.81	0.42	-0.19	0.46	0.01
Education	-0.37	0.18	5203.10	-2.02	0.04	-0.73	-0.01	0.03
Education x Emotion Intensity	0.02	0.07	652.53	0.35	0.72	-0.11	0.16	0.01
Education x Emotion Intensity PM	0.15	0.11	3503.51	1.38	0.17	-0.06	0.37	0.02

HR Reactivity ~								
Emotion Intensity	0.46	0.22	1535.51	2.13	0.03	0.04	0.88	0.05
Emotion Intensity PM	0.35	0.29	5014.94	1.22	0.22	-0.21	0.92	0.02
Age	-0.05	0.03	4908.83	-1.62	0.10	-0.11	0.01	0.02
Age x Emotion Intensity	0.00	0.02	1498.08	0.17	0.87	-0.03	0.03	0.00
Age x Emotion Intensity PM	0.01	0.02	4768.12	0.65	0.52	-0.03	0.06	0.01
Sex	-0.70	0.79	4943.61	-0.89	0.37	-2.25	0.85	0.01
Sex x Emotion Intensity	0.29	0.38	1358.76	0.76	0.45	-0.45	1.03	0.02
Sex x Emotion Intensity PM	0.28	0.51	4683.33	0.54	0.59	-0.73	1.29	0.01
Health	0.20	0.38	5106.85	0.53	0.59	-0.55	0.96	0.01
Health x Emotion Intensity	0.09	0.20	1312.69	0.45	0.65	-0.30	0.47	0.01
Health x Emotion Intensity PM	-0.07	0.26	4070.14	-0.27	0.78	-0.58	0.44	0.00
Education	-0.11	0.24	4860.94	-0.45	0.65	-0.59	0.37	0.01
Education x Emotion Intensity	-0.11	0.13	1610.25	-0.84	0.40	-0.37	0.15	0.02
Education x Emotion Intensity PM	0.13	0.17	4695.04	0.75	0.45	-0.21	0.47	0.01
Low Arousal Positive								
SBP Reactivity ~								
Emotion Intensity	-0.44	0.06	2773.81	-7.08	0.00	-0.56	-0.31	0.13
Emotion Intensity PM	0.37	0.13	15298.81	2.80	0.01	0.11	0.63	0.02
Age	-0.10	0.02	12894.85	-5.29	0.00	-0.13	-0.06	0.05
Age x Emotion Intensity	-0.01	0.00	2776.10	-1.86	0.06	-0.02	0.00	0.04
Age x Emotion Intensity PM	0.02	0.01	15421.88	1.83	0.07	0.00	0.03	0.01
Sex	0.82	0.53	13129.98	1.55	0.12	-0.22	1.85	0.01
Sex x Emotion Intensity	0.14	0.12	2763.98	1.12	0.26	-0.10	0.38	0.02
Sex x Emotion Intensity PM	-0.15	0.26	15375.95	-0.58	0.56	-0.66	0.36	0.00
Health	0.21	0.25	12810.49	0.85	0.39	-0.27	0.69	0.01
Health x Emotion Intensity	0.00	0.06	2518.96	0.06	0.95	-0.12	0.12	0.00
Health x Emotion Intensity PM	-0.09	0.12	14806.87	-0.72	0.47	-0.33	0.16	0.01
Education	0.23	0.15	13001.79	1.49	0.14	-0.07	0.53	0.01
Education x Emotion Intensity	-0.04	0.04	3074.08	-0.96	0.34	-0.11	0.04	0.02
Education x Emotion Intensity PM	-0.05	0.08	15842.00	-0.58	0.56	-0.20	0.11	0.00
DBP Reactivity ~								
Emotion Intensity	-0.40	0.05	2636.19	-7.92	0.00	-0.50	-0.30	0.15
Emotion Intensity PM	0.37	0.12	15524.87	3.20	0.00	0.15	0.60	0.03
Age	-0.05	0.02	13128.82	-3.39	0.00	-0.09	-0.02	0.03
Age x Emotion Intensity	-0.01	0.00	2551.22	-1.63	0.10	-0.01	0.00	0.03
Age x Emotion Intensity PM	0.01	0.01	15526.32	0.66	0.51	-0.01	0.02	0.01
Sex	0.97	0.47	13370.57	2.07	0.04	0.05	1.90	0.02
Sex x Emotion Intensity	0.11	0.10	2598.94	1.06	0.29	-0.09	0.30	0.02
Sex x Emotion Intensity PM	-0.27	0.23	15596.76	-1.17	0.24	-0.72	0.18	0.01
Health	0.13	0.22	13072.66	0.60	0.55	-0.30	0.56	0.01

Health x Emotion Intensity	0.01	0.05	2249.41	0.27	0.79	-0.08	0.11	0.01
Health x Emotion Intensity PM	-0.06	0.11	14932.11	-0.55	0.58	-0.27	0.15	0.00
Education	0.11	0.14	13246.96	0.79	0.43	-0.16	0.38	0.01
Education x Emotion Intensity	0.00	0.03	2814.80	0.01	0.99	-0.06	0.06	0.00
Education x Emotion Intensity PM	-0.05	0.07	15933.82	-0.71	0.48	-0.19	0.09	0.01
HR Reactivity ~								
Emotion Intensity	-0.19	0.09	3068.64	-2.17	0.03	-0.36	-0.02	0.04
Emotion Intensity PM	0.11	0.15	14005.13	0.69	0.49	-0.19	0.41	0.01
Age	-0.03	0.02	10745.60	-1.56	0.12	-0.07	0.01	0.02
Age x Emotion Intensity	0.01	0.01	3065.34	0.89	0.38	-0.01	0.02	0.02
Age x Emotion Intensity PM	0.00	0.01	14129.61	0.38	0.70	-0.02	0.02	0.00
Sex	-1.99	0.57	11048.33	-3.48	0.00	-3.10	-0.87	0.03
Sex x Emotion Intensity	0.24	0.18	3054.01	1.38	0.17	-0.10	0.59	0.02
Sex x Emotion Intensity PM	0.44	0.30	14072.75	1.47	0.14	-0.15	1.04	0.01
Health	-0.19	0.27	10751.87	-0.69	0.49	-0.71	0.34	0.01
Health x Emotion Intensity	-0.14	0.09	2769.28	-1.61	0.11	-0.31	0.03	0.03
Health x Emotion Intensity PM	0.09	0.15	13244.57	0.62	0.53	-0.20	0.38	0.01
Education	0.10	0.17	10932.15	0.58	0.56	-0.23	0.43	0.01
Education x Emotion Intensity	-0.05	0.06	3395.38	-0.82	0.41	-0.16	0.06	0.01
Education x Emotion Intensity PM	0.03	0.09	14565.88	0.32	0.75	-0.15	0.21	0.00
High Arousal Positive								
SBP Reactivity ~								
Emotion Intensity	-0.01	0.08	1796.90	-0.15	0.88	-0.17	0.15	0.00
Emotion Intensity PM	-0.10	0.16	10135.87	-0.63	0.53	-0.42	0.22	0.01
Age	-0.09	0.02	8694.38	-3.91	0.00	-0.14	-0.05	0.04
Age x Emotion Intensity	-0.01	0.01	1898.97	-2.50	0.01	-0.02	0.00	0.06
Age x Emotion Intensity PM	0.01	0.01	10290.54	1.25	0.21	-0.01	0.03	0.01
Sex	1.49	0.69	8839.86	2.14	0.03	0.12	2.85	0.02
Sex x Emotion Intensity	0.39	0.16	1795.40	2.43	0.02	0.08	0.71	0.06
Sex x Emotion Intensity PM	-0.75	0.32	10156.25	-2.31	0.02	-1.39	-0.11	0.02
Health	0.47	0.32	8603.45	1.48	0.14	-0.15	1.10	0.02
Health x Emotion Intensity	0.12	0.07	1690.57	1.54	0.12	-0.03	0.26	0.04
Health x Emotion Intensity PM	-0.25	0.15	9884.93	-1.69	0.09	-0.55	0.04	0.02
Education	0.18	0.20	8421.36	0.92	0.36	-0.20	0.57	0.01
Education x Emotion Intensity	0.01	0.05	1644.44	0.15	0.88	-0.09	0.10	0.00
Education x Emotion Intensity PM	-0.09	0.10	9330.18	-0.96	0.34	-0.28	0.10	0.01
DBP Reactivity ~								
Emotion Intensity	-0.19	0.07	1725.71	-2.83	0.00	-0.33	-0.06	0.07
Emotion Intensity PM	-0.10	0.14	10333.87	-0.70	0.48	-0.38	0.18	0.01
Age	-0.05	0.02	8904.97	-2.27	0.02	-0.09	-0.01	0.02
Age x Emotion Intensity	-0.02	0.00	1827.52	-3.68	0.00	-0.03	-0.01	0.09

Age x Emotion Intensity PM	0.01	0.01	10484.01	1.11	0.27	-0.01	0.03	0.01
Sex	0.89	0.61	9048.42	1.46	0.14	-0.30	2.09	0.02
Sex x Emotion Intensity	0.17	0.14	1724.54	1.22	0.22	-0.10	0.43	0.03
Sex x Emotion Intensity PM	-0.30	0.28	10356.11	-1.07	0.28	-0.86	0.25	0.01
Health	0.53	0.28	8821.42	1.87	0.06	-0.03	1.08	0.02
Health x Emotion Intensity	0.10	0.06	1622.01	1.67	0.10	-0.02	0.23	0.04
Health x Emotion Intensity PM	-0.25	0.13	10092.42	-1.91	0.06	-0.51	0.01	0.02
Education	0.04	0.17	8636.76	0.24	0.81	-0.30	0.38	0.00
Education x Emotion Intensity	0.01	0.04	1567.83	0.34	0.74	-0.07	0.09	0.01
Education x Emotion Intensity PM	-0.04	0.08	9534.62	-0.52	0.60	-0.21	0.12	0.01
HR Reactivity ~								
Emotion Intensity	0.69	0.12	2233.45	5.66	0.00	0.45	0.92	0.12
Emotion Intensity PM	-0.17	0.20	9408.62	-0.87	0.38	-0.56	0.21	0.01
Age	-0.07	0.03	7326.40	-2.61	0.01	-0.12	-0.02	0.03
Age x Emotion Intensity	0.00	0.01	2347.36	0.33	0.75	-0.01	0.02	0.01
Age x Emotion Intensity PM	0.00	0.01	9561.60	0.27	0.78	-0.02	0.03	0.00
Sex	-0.62	0.77	7525.19	-0.81	0.42	-2.13	0.89	0.01
Sex x Emotion Intensity	0.43	0.24	2231.48	1.79	0.07	-0.04	0.91	0.04
Sex x Emotion Intensity PM	-0.41	0.39	9434.50	-1.05	0.30	-1.18	0.36	0.01
Health	-1.15	0.35	7134.70	-3.25	0.00	-1.84	-0.46	0.04
Health x Emotion Intensity	-0.11	0.11	2102.28	-0.95	0.34	-0.33	0.11	0.02
Health x Emotion Intensity PM	0.37	0.18	8990.30	2.02	0.04	0.01	0.72	0.02
Education	0.16	0.22	7043.32	0.73	0.46	-0.27	0.59	0.01
Education x Emotion Intensity	0.02	0.07	2059.39	0.24	0.81	-0.13	0.16	0.01
Education x Emotion Intensity PM	-0.10	0.12	8319.79	-0.84	0.40	-0.33	0.13	0.01

Note: PM = person mean (aggregate of all responses for each participant); sex coded -.5 = female, .5 = male; age filtered to <91; random effects for these models differ by less than a point from random effects for model with age only as a moderator.

$$*r = \sqrt{\left(\frac{t^2}{t^2+df}\right)}$$